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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/781,339	02/18/2004	Roberto R. Panepucci	1153.099US1	9241

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EXAMINER	
STAHL, MICHAEL J	
ART UNIT	PAPER NUMBER
2874	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	01/03/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/781,339	PANEPUCCI ET AL.	
	Examiner	Art Unit	
	Mike Stahl	2874	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 November 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-30* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *17-26* is/are allowed.

6)☒ Claim(s) *1-16 and 27-30* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on November 15, 2006 has been entered.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-2, 5, and 30 are rejected under 35 U.S.C. 102(b) as being anticipated by Tschulena (US 5437186).

Claim 1: Tschulena discloses an optical sensor comprising: a substrate **1** having an opening; a cantilevered micro-mechanical waveguide **7** having a first portion supported by the substrate and a second portion suspended over the opening in the substrate; and a receiving structure **8** positioned to receive light transmitted from an end of the second portion of the cantilevered waveguide. See fig. 3a.

Claim 2: The receiving structure includes a waveguide **8** having an end facing the light transmitting end of the second portion of the cantilevered waveguide.

Claim 5: The sensor further includes an optical fiber **4** that supplies light to the waveguide **7**.

Claim 30: The process of operating the Tschulena device includes all the recited steps.

Claims 1-2, 10-12, 15, and 30 are rejected under 35 U.S.C. 102(b) as being anticipated by Muller et al. (article in Materials Science in Semiconductor Processing, October 2000).

Claim 1: Muller discloses an optical sensor comprising: a substrate having an opening; a cantilevered micro-mechanical waveguide having a first portion supported by the substrate and a second portion suspended over the opening in the substrate; and a receiving structure positioned to receive light transmitted from an end of the second portion of the cantilevered waveguide. See fig. 1.

Claim 2: The receiving structure includes a waveguide having an end facing the light transmitting end of the second portion of the cantilevered waveguide.

Claim 10: The optical sensor further includes a stress layer formed on the cantilevered micro-mechanical waveguide (fig. 3; last full paragraph on p. 428 right column).

Claim 11: The stress layer includes silicon nitride (fig. 7; last paragraph on p. 428 left column).

Claim 12: In addition to the parts mentioned above with regard to claim 1, the sensor includes actuating means (p. 428 left column 2nd paragraph).

Claim 15: The means for actuating increases the sensitivity of the cantilevered waveguide without significantly degrading a quality factor.

Claim 30: The process of operating the Muller device includes all the recited steps.

Claims 1-2, 5, 12-16, and 30 are rejected under 35 U.S.C. 102(b) as being anticipated by Churenkov (article in Sensors and Actuators A, October 1996).

Claim 1: Churenkov discloses an optical sensor comprising: a substrate having an opening; a cantilevered micro-mechanical waveguide having a first portion supported by the substrate and a second portion suspended over the opening in the substrate; and a receiving structure positioned to receive light transmitted from an end of the second portion of the cantilevered waveguide. See fig. 1(e).

Claim 2: The receiving structure includes a waveguide having an end facing the light transmitting end of the second portion of the cantilevered waveguide.

Claim 5: The sensor further includes an optical fiber that supplies light to the waveguide (fig. 5).

Claims 12, 13, 16: In addition to the parts mentioned above with regard to claim 1, the sensor includes actuating means, which may be a piezoactuator or an electrostatic actuator (paragraph spanning pp. 24-25).

Claim 14: The fig. 5 embodiment includes a piezoactuator **9**. This can be regarded as being below the substrate, depending on how one looks at the figure. "Below" is a relative term of orientation.

Claim 15: The means for actuating increases the sensitivity of the cantilevered waveguide without significantly degrading a quality factor.

Claim 30: The process of operating the Churenkov device includes all the recited steps.

Claims 1, 7-9, and 27-30 are rejected under 35 U.S.C. 102(a) as being anticipated by Evans et al. (US 6525307).

Claim 1: Evans discloses an optical sensor comprising: a substrate **304/308** having an opening; a cantilevered micro-mechanical waveguide **312** having a first portion supported by the substrate and a second portion suspended over the opening in the substrate; and a receiving structure **322** positioned to receive light transmitted from an end of the second portion of the cantilevered waveguide. See fig. 3.

Claim 7: In one embodiment the cantilever waveguide includes a selectively receptive substance attached to the second portion of the cantilever waveguide a desired distance from the light transmitting end of the second portion (col. 4 lns. 16-23).

Claim 8: The cantilever waveguide has a resonant frequency of oscillation that changes when something attaches to the selectively receptive substance.

Claim 9: It is considered inherent that the selectively receptive substance may be bio-receptive, since bio-reception can be regarded as a special case of chemo-reception.

Claims 27-30: The process of operating the Evans device described above includes all the recited steps.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 3-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tschulena (cited above) in view of Rines (US 4414471, cited in a previous action).

Tschulena is not showing a reflector supported by the substrate facing and reflecting light back into the light transmitting end of the second portion of the cantilevered waveguide. Rines discloses such a reflective arrangement at fig. 4 and suggests that it eliminates the need for a separate waveguide to carry the signal to the detector (col. 3 lns. 41-43). Thus it would have been obvious to a skilled person to set up the Tschulena device with the recited reflective arrangement suggested by Rines. The skilled person would have been motivated to make this modification by an expectation of a simplified and more compact arrangement of parts with respect to the light source and detector.

Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tschulena (cited above) in view of Cho et al. (US 5265177, cited in a previous action).

Tschulena is not showing a nano-taper at the second end of waveguide **7** that contacts a light emitting end of the fiber **7**. Cho teaches using a nano-taper **12** to couple an optical fiber **13** to an integrated waveguide device (including layers **15/16/17**). Note figs. 1-2. The nano-taper permits improved mode matching between the integrated waveguide and the fiber, and relaxes the alignment tolerances (col. 1 lns. 14-34; col. 2 lns 47-62). Thus it would have been obvious to a skilled person to include in the Tschulena device a nano-taper to couple fiber **4** to waveguide **7** as suggested by Cho. The skilled person would have been motivated to make this inclusion by an expectation of improved optical coupling efficiency.

Response to Arguments (November 15, 2006 response)

The affidavit per 37 CFR 1.131 is considered sufficient to disqualify the previously applied Tran et al. reference. As to the Rines reference, the addition of the term "micro-mechanical" to claims 1 and 30 is considered sufficient to distinguish over the Rines reference. There is obviously a difference between optical fibers and "micro-mechanical" waveguides as evidenced by applicant's disclosure. It is believed that a skilled person in the art would understand the term "micro-mechanical". The previous rejections based on Tran and Rines have been withdrawn.

Allowable Subject Matter

Claims 17-26 are allowed. The applied prior art does not teach or suggest an arrangement of a plurality of cantilevered waveguides which are optically coupled to a supply waveguide via a plurality of ring resonators.

Conclusion

The additional references listed on the attached PTO-892 form are considered relevant to this application.

Inquiries about this letter should be directed to Mike Stahl at 571-272-2360. Inquiries of a general or clerical nature (e.g., a request for a missing form or paper, etc.) should be directed to the technical support staff supervisor at 571-272-1626. Official communications which are eligible for submission by facsimile and which pertain to this application may be faxed to 571-273-8300. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Mike Stahl MJS
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Art Unit 2874

December 25, 2006

Rodney Bovernick
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